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or more plates devoted in part to the illustration of the earlier stages of our butterflies, while the text has constantly improved from that point up to the present time ; a far larger proportion of the space being now occupied in treating of the biology and distribution of butterflies, and with their climatic and seasonal variations—the latter a study in which our author has taken the first rank in this country.

The first series of parts was completed in five years ; the second has occupied more than ten for its issue. But the value of the second, with twenty-seven out of its fifty-one plates devoted in part to illustrations of the earlier stages, is beyond comparison more valuable than the first series, in which only nine out of the fifty plates contained any illustration whatever of the earlier conditions of the existence of these animals. As to the execution of the plates, no iconography of the present time excels them ; in faithfulness and sobriety of color, in gracefulness of disposition upon the plates, in artistic execution and in faithful representation of the minutest details, they surpass anything that has been given to the world from the most famed *ateliers* of Europe. There is little inequality about them. They are uniformly exquisite, and lepidopterists the world over are indebted to Mr. Edwards for the faithfulness and luxury of his illustrations. By text and plates he has enriched the natural history of our native butterflies to such an extent, during the seventeen years in which these two volumes have been passing through the press, that the butterfly fauna of the United States is now quite as well known and illustrated as that of any equal region elsewhere, not excluding the long gleaned fields of Europe.

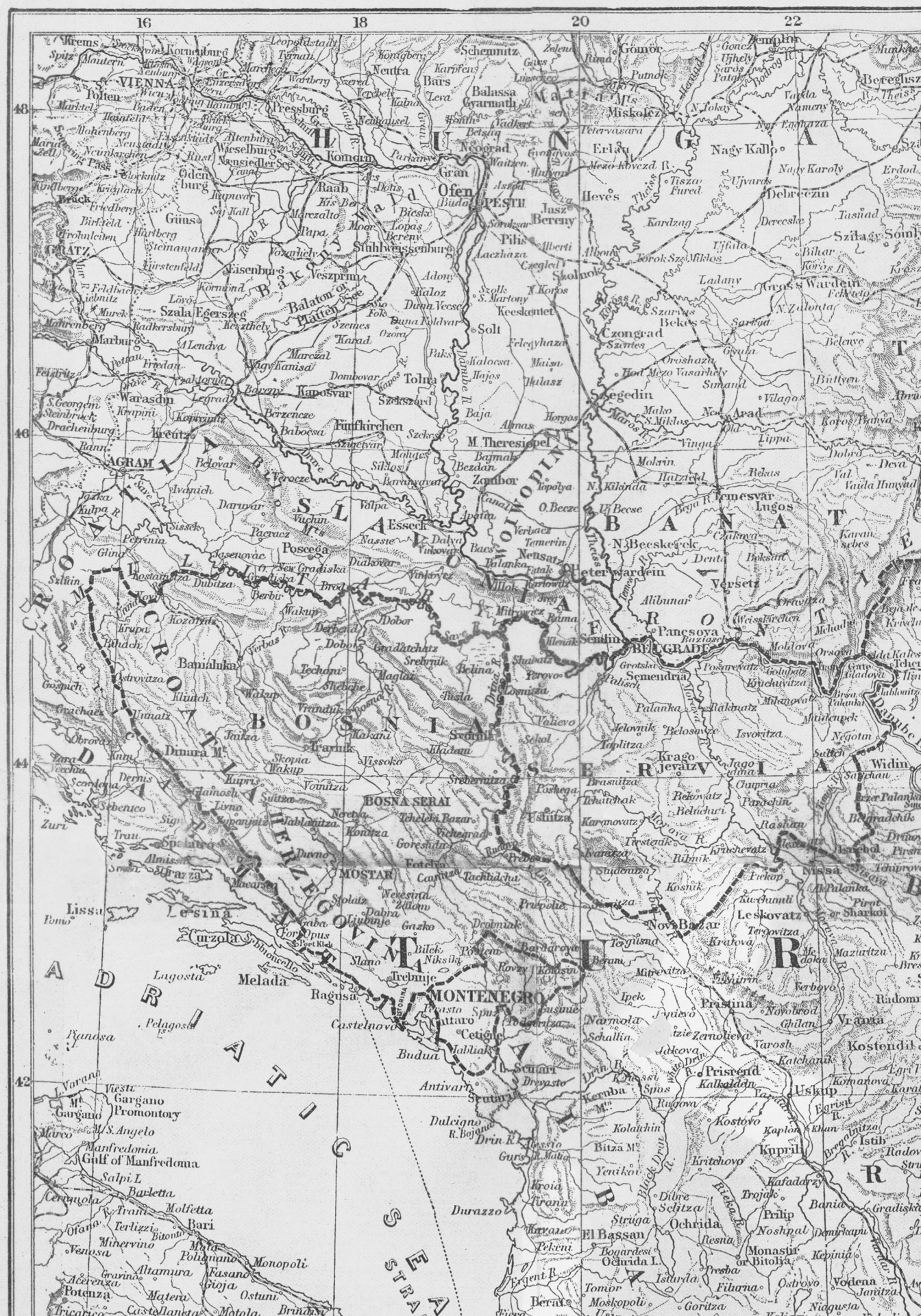
The manufacture of the book is equally creditable, with the single exception of the difficulty of reference. By the system adopted it becomes necessary to refer to plate 'Papilio 8B,' for instance, instead of to a single number. So also the text is unpaged, excepting in a few instances where it is separately paged throughout a single part, as in 'Lycaena II.–III.' The author's intention is that at the close of the volumes text and plates shall be re-distributed and bound in an order fixed by himself, and then numbered in pencil ; and he gives, therefore, a numerical order to the plates. But this is a most unsatisfactory method, and there is no index to the volume, so that any reference to the text is troublesome and vague.

In closing the first series of his 'Butterflies,' Mr. Edwards gave what he termed a 'Synopsis of North American butterflies,' with ample reference to the literature of the subject. This he has wisely discarded at the close of the present volume, substituting therefor a merely nominal list of species. In this, however, in which the number of species is raised from 512 to 612, he retains in nearly every particular the antique classification adopted in the first volume. The studies which Mr. Edwards has undertaken upon the history of butterflies have rendered him an authority on that subject, and his skill in field investigation has been unexcelled. This, however, constitutes no claim whatever to any knowledge of the structure itself of butterflies, upon which classifications must be founded ; and as he has shown no such knowledge in his writings, we can only regret that he did not altogether omit this list, since it carries an authority to the public eye which it does not possess, the classification being not only faulty in many minute particulars, but fundamentally false to nature.

LIPPS'S PSYCHOLOGICAL STUDIES.

This firmly and clearly-written volume is the work of a very acute and able man. No competent person will read it without wishing to read the other work to which its author refers,—his 'Grundthatsachen des seelenlebens' (Bonn, 1883). One can never do justice to a psychologist without knowing the *ensemble* of his views ; and as we have not yet seen the larger volume, our own notice better be descriptive than critical. There are two essays in the work before us ; one on visual space-perception, the other on the essence of musical harmony and discord ; and both stick close to the particular matter in hand. In the space-perception essay, these topics are treated of: the nature of seen *distance*, the continuity of the field of view as connected with the filling out of the *blind spot*, and the *space intervals* seen between different retinal spots when the latter are excited. On all these subjects Dr. Lipps's views are thoroughly original. To take the last one first ; it is an empirical fact that (distance and eye-position being equal) an object appears of about the same size to us, no matter on what part of the retina its image falls ; why is this so ? why, on the whole, do equal retinal distances correspond to equal extensions seen ? The simplest answer is that they have an inborn tendency to do so, of which we can give no farther account. This answer is nowadays unpopular—notwithstanding the very great ability of some of those who defend it, first because it is the fashion to substitute *genesis* for *innateness* everywhere in our explanations just now, and second because there are *variations* in the judgments of size, shape, distance apart, etc., which we get from the same retinal tracts, under different

Psychologische studien. Von Dr. Theodor Lipps. Heidelberg. *Weiss.* 1885, 161p.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H U N G A R Y
S L A V O N I A
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M I L I T A R Y F R O N T I E R
BANAT
WOIWODINA
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H E R Z E G O V I N A
S E R V I A
T U R K E Y
MONTENEGRO
A L B A N I A
D A L M A T I A
A D R I A T I C S E A
STRAIT
Bakony Wald
Matra Mts
VIENNA
Pressburg
Komorn
Raab
Gran
Ofen
Buda
PESTH
Stuhlweissenburg
Veszprim
Balaton or Platten See
Neusiedler See
Odenburg
Güns
GRÄTZ
Marburg
Warasdin
AGRAM
Eisenburg
Szala Egerszeg
Nagy Kanisa
Kaposvar
Fünfkirchen
Szekszard
Tolna
Solt
Kecskemet
Szolnok
Czegled
Jasz Bereny
Heves
Erlau
Miskolcz
Gömör
Schemnitz
Neutra
Bars
Balassa Gyarmath
Neograd
Waitzen
Nagy Kallo
Debreczin
Gross Wardein
Bekes
Czongrad
Szegedin
Arad
Temesvar
Lugos
Versetz
Panesova
Peterwardein
Neusatz
Zombor
M. Theresiopel
Esseck
Vukovar
Posega
Brod
Gradiska
Kostainitza
Dubitza
Novi
Banialuka
Travnik
BOSNA SERAI
Svornik
Dinara Mt.
Livno
Spalatro
MOSTAR
Trebinje
Ragusa
Cattaro
Cetigne
Scutari
Antivari
Dulcigno
Durazzo
Kroia
Tiranr
El Bassan
Ochrida
Monastir or Bitolia
Prilip
Kupril
Uskup
Prisrend
Pristina
Ipek
Novi Bazar
Nissa
Leskovatz
Kragojevatz
Semendria
BELGRADE
Semlin
Shabatz
Valievo
Widin
Orsova
Lissa
Lesina
Curzola
Lagosta
Melada
Pelagosa
Gargano Promontory
Gulf of Manfredonia
Manfredonia
Barletta
Trani
Molfetta
Bari
Monopoli
Potenza
Danube R.
Drave R.
Save R.
Theiss R.
Maros R.
Morava R.
Drina R.
Bosna R.
Drin R.
Black Drin R.
Vardar R.
Koros R.
Bega R.
Timok R.
Ochrida L.
Scutari L.


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Nagy Kallo
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Kecskemet
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Peterwardein
Neusatz
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M. Theresiopel
Gross Wardein
Szilagy Somlyo
Dees
Klausenburg
Maros Vasarhely
Szamos Ujvar
Bistritz
Karlsburg
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HERMANSTADT
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Kronstadt
Czernowitz
Suczawa
Radautz
Botuchany
Jassy
Bakeu
Okna
Rimnik
Plojesti
Buseo
BUKHAREST
Giurgevo
Rustchuk
Sistova
Nicopolis
Plevna
Widin
Crajova
Slatina
Kalafat
Tirgoshyl
Kimpolung
Turnu
Semendria
Pozarevatz
Negotin
Kragojevatz
Nissa
Pirot
Leskovatz
Novi Bazar
Pristina
Ipek
Prisrend
Uskup
Kostendil
Sophia
Samakovo
Radomir
Vranja
Philippopolis
Tatar Basardjik
Eski Saghra
Kesanlik
Tirnova
Gabrova
Lovatz
Etropol
Shumla
Rasgrad
Osman Bazar
Tchirpan
Haskoi
Kirdchali
Dimotika
Enos
Seres
Drama
Kavala
Thasos
Demir Hissar
Strumnitza
Istib
Kupruli
Prilip
Monastir or Bitolia
Ochrida
Ochrida L.
El Bassan
Berat
Goritza
Vodena
Skutari
MONTENEGRO
Dibre
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Balkan
Danube R.
Theiss R.
Maros R.
Morava R.

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Ananiev
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Botuchany
Suczava
Radautz
Borsa
Orgeiev
Dubosary
Grigoriopol
Tiraspol
Bender
KISHENAU
JASSY
Roman
Bistritz
Szamos Ujvar
Dees
Odessa
Akerman
Mouth of Dniester
Berlat
Faltsi
Bakeu
Okna
Adjiud
Kronstadt
HERMANSTADT
Mediasch
Maros Vasarhely
Klausenburg
TRANSYLVANIA
MOLDAVIA
BESSARABIA
Galatz
Brahilov
Rimnik
Ismael
Tultcha
Kilia Mouth
Sulina Mouth of the Danube
St. Georges Mouth
Babadagh
Hirsova
Tchernavoda
Kustendji
BUKHAREST
Kalarash
Silistria
Giurgevo
Rustchuk
Sistova
Nicopolis
Plevna
Lovatz
Tirnova
Gabrova
Shumla
Rasgrad
Yeni Bazar
Varna
Basardjik
Baltjik
C. Kaliakra
Mangalia
BLACK
SEA
Slatina
Krajova
Karakal
Pitesti
Tergovist
Bulgareni
Selimno
Kesanlik
Burghas
Gulf of Burghas
Aidos
C. Emineh
Eski Saghra
Philippopolis
Tatar Basardjik
Samakovo
Ichtiman
Hermanli
ADRIANOPLE
Kirk Kilisseh
C. Kuri or Iniada
Iniada
Midia
Dimotika
Rodosto
CONSTANTINOPLE
Scutari
Bosporus
SEA OF MARMORA
Marmora I.
Enos
C. Paxi
Thasos
Seres
Drama
Kavala
Despoto Dagh
Balkan
Danube

MAP SHOWING REGIONS AFFECTED BY

SHOWING REGIONS AFFECTED BY THE RECENT REVOLUTION IN BULG

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circumstances, and these variations seem often in a singular way to conform to what they would be like if the retinal excitements acted on the mind by *suggesting* space determinations learned in some other way. Even should the retinal tracts have innate feelings of extension of their own, the variations in question force us to admit that the innate extensions etc., are often overpowered by the suggestion of other and different ones. Thus the nativistic school of explanation is replaced by the 'empiristic' school, as Helmholtz calls it. The experiences, whose suggestions prove themselves to be so much more powerful than anything else, are, for these authors, on the whole, experiences of *motion*. The movements of the eyeball are the *deus ex machina* which shall solve all riddles. The excessive intricacy and delicacy of the facts to be interpreted can be estimated by the differences of opinion that still exist among the interpreters—many of them men of as great ability as our century has shown in any intellectual field. Dr. Lipps now rushes into their midst, and deals blows against the whole movement-theory that ought really to warm the hearts of its doubters. Whatever it be that measures off the field of view and establishes directions and distances between the impressions we get from retinal points, it is, according to him, neither muscular sensation nor feeling of innervation,—it must be something else. Let us say here, that however it may fare with Dr. Lipps's positive theories, this critical onslaught of his is a permanent achievement from which it will be hard for the muscle-theory to recover. 'Feelings of movement' and 'unconscious inferences' have too long run riot and had it their own way in the philosophy of vision. Being more or less hypothetical entities, one may construct very much what one pleases with them, and hitherto they have turned a deaf ear to critics. The champions of the feelings of movement can, however, hardly ignore Dr. Lipps's manner of calling their protégés to account.

Dr. Lipps's own theory is nativistic to the extent of admitting that if ever retinal impressions are discriminated at all, their difference will (by an inexplicable law) appear as a difference of position. It is however 'empiristic' first, in that it assumes that no discrimination would occur at all unless differently colored extended *objects* were what excited the retina in the first instance; and second, in that it makes the *average extension of the objects* determine the extension at which the various excited retinal points shall appear to us apart. Adjacent points everywhere on the retina are more likely to have a portion of one object than the boundary of two objects cast upon them. Distant points are more likely to be excited by different objects than by the same object. Distant points will tend then rather to be discriminated; adjacent points rather to remain fused together. The object-experiences of intermediate points will have helped partly to separate them, partly to keep them together. The author seems to think that with a greater tendency of two points to be discriminated will go a feeling of their greater, and with a lesser tendency, a feeling of their lesser, distance apart—a point which he has not made theoretically sufficiently clear.

The tendency to be fused together until discriminated is for Dr. Lipps fundamental. That the borders of the blind spot should give images that are fused, and run into each other, that are without breach of visual continuity between them, is nothing peculiar. Every part of the retina is similarly continuous with every other, even distant, part. We *see* then space *continuous* over the blind spot. How *much* we see there is determined by the general law of discrimination. The two borders of the spot receive images sometimes of the same, sometimes of different objects, and the balance of their tendencies to fuse and separate is what will determine their apparent distance apart. A close study of the actual phenomena of the blind spot is apparent in this section.

The section on the perception of the third dimension, depth, or distance, is properly an expansion of Ferrier's commentary on Berkeley. Berkeley said we cannot see distance. Ferrier, the metaphysician, said we can *see* space only between two things both of which we see. We cannot see our own eye; *ergo* we cannot see the space between it and anything else. But such space is what is meant by distance; *ergo* we cannot see distance. Dr. Lipps enforces this by the most remorseless logic, denying that there *is* any properly so called visual *perception* of the third dimension at all. There is merely a conceptual *knowledge* of it. He makes a brave attempt to explain away the apparently direct sensational character of this knowledge, as when we look, for example, into the stereoscope; and he makes a heavy attack on Stumpf as the ablest advocate of a direct feeling of depth. He carries the discussion to a point, as it seems to us, where it becomes largely a matter of words. To admirers of Berkeley, however, it may be said, that nowhere has the original negative Berkeleian doctrine about distance received anything like such able support as this.

In the essay on musical discord, our author reverts to the old-fashioned theory of a subtle sense for the incongruity of the rates of vibrations of the notes simultaneously heard. He shows by an interesting experiment how hard it is to hear one rhythm made outside of us, and to carry on a differ-

ent incommensurate rhythm ourselves, whether by movement, or inward time keeping. Helmholtz it is known explains discord by '*beats*,' harmony by their absence; and melody he explains by the 'affinity' of the consecutive notes, *i. e.*, the presence in them of identical over-tones. All these theories Dr. Lipps denies, to touch the essence of the matter; and reduces harmony, discord, and melody to the single positive principle of felt congruence or incongruence of vibratory rates. The paper is too technical to be gone into in more detail. All musical æstheticians should read it. It closes a little book, which, for acuteness, clearness and vigor, has not been surpassed for many a long year.

ASTRONOMICAL NOTES.

IT appears from the latest reports we have seen that the new star in the Andromeda nebula (31 Messier) to which attention was first generally called by Hartwig's telegram, was discovered independently by several observers, one at least antedating Dr. Hartwig. Dun Echt Circular No. 98 announces that it was seen by Mr. Isaac W. Ward on August 19, and by M. Lajoye at Rheims, August 30. Baron von Spiessen at Winkel, in Prussia, seems to have noticed it on the evening of August 30, about 9¼h., communicating his observation to Dr. Deichmüller by mail. On August 31, at 10h. 20m. Berlin mean time (before the arrival of Hartwig's telegram), Dr. Oppenheim turning his 3½ inch comet seeker upon the nebula, noticed the new star-like nucleus and estimated it to be between the 5th and 6th magnitude. The new star was also independently discovered by G. W. Middleton, at Mexbro' Common, England, on September 3. Hartwig telegraphed the peculiar appearance of the nebula from Dorpat at 10h. 15m., August 31. We have the testimony of different observers that the star was not there in the early part of August. Hartwig estimated it at 7th magnitude on August 31, Oppenheim making it 5th to 6th magnitude, and Lamp 7.4 magnitude on the same evening. On September 1, and for several days following, it was variously estimated from the 6th to 7th magnitude, and since that time it has gradually grown fainter, the latest estimate (by Mr. Skinner, with the transit circle of the naval observatory, September 30) making it of about 9½ magnitude. On September 2 it was reported visible to the naked eye. In color it was called red and orange during the first week in September, but it now appears nearly white. We learn from the *Athenaeum* that Mr. Maunder examined the star with the large spectroscope of the Greenwich observatory, describing the spectrum as of precisely the same character as that of the nebula, *i.e.*, it was perfectly continuous, no lines either bright or dark being visible, and the red end wanting, so that there is at present no evidence of any outburst of heated gas, as was the case with the star T Coronae in 1866, and Nova Cygni in 1876.

The Andromeda nebula, though probably composed of a great number of very small stars, has never been resolved. The spectroscope seems to show that it is not gaseous. Assuming that the nebula is stellar in nature, and that the 14th magnitude is the upper limit of any one of its component stars, then a rise from the 14th to the 7th magnitude indicates an increase in brightness of 631 fold, which renders it very improbable that the star is one of the constituent parts of the nebula. It seems rather more probable that it is a variable or new star which happens to be in line with the nebula as seen from the earth.

The following observations of the *Nova* were made with the transit-circle of the naval observatory, and, by permission of the superintendent, are herewith communicated. The estimates of magnitude are differential with respect to the star $W^2\ 0_h$, 969 which follows the *Nova* about 2m., and is assumed to be 9.0 mag. Photometric observations of this star would be desirable:

Date. 1885.	Observer.	Magnitude.	1885.0					
			α			δ		
			h.	m.	s.	°	′	″
Sept. 17	W.	9.1	0	36	26.86	+40	38	12.6
" 23	P.	9.5			26.84			14 7
" 24	W.	9.6			26.87			12.8
1885.727		9.4	0	36	26.86	+40	38	13.4

Professor Pickering, in the Proceedings of the American society of psychical research (see *Science* vol. vi., p. 155) finds, from discussing a large number of observations, that the knowledge of a catalogue-magnitude of a star on the part of a recorder appears to exert through the medium of 'thought-transferrence,' no influence upon the independence of the observer's estimate of the same.

For the floating dome of the observatory at Nice it is proposed to employ a solution of chloride of magnesium of a density of 1.25, which will not freeze down to—40° C.

Comet 1885 II (Barnard). A conjecture having been expressed by Faye and Krueger that Barnard's comet might be periodic, Dr. Lamp, of Kiel, has computed elliptic elements and finds a period of 8,700 years. He remarks, however that, owing to the uncertainty in the single observations employed, his results can hardly be considered decisive, and the orbit may yet turn out parabolic.